

Hard Facts About Soft Matter – Self-Assembled Multi-Component Gels for High-Tech Applications

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Soft matter systems, self-assembled from molecular-scale building blocks, offer a powerful strategy by which we can program and control the nanoworld, from the molecular-level up. We will discuss the self-assembly of soft, gel-phase nanomaterials, and learn how molecular structure can be translated into nanoscale architectures through non-covalent supramolecular interactions with a high degree of control.¹ Directed self-assembly can occur within complex mixtures in order to yield multi-component materials with multiple functions. We use self-assembly methods to create 'multi-domain' gel systems which have one gel assembled in the presence of another, with both spatial and temporal control.² Our simple approaches to assembling multi-component systems generate soft materials with potential applications ranging from pharmaceutical formulation and pollution control to nanoscale electronics and tissue engineering.³ We will discuss this approach with regard to peptide organogels and also novel hydrogels based on the industrially-relevant 1,3:2,4-dibenzylidenesorbitol (DBS) framework.⁴

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